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Investigation of heavy metals emission from pyrolysis product of rubber wastes treated with ashing

Nasyrov I., Terentyeva V., Mavrin G.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018 BRNSS Publication Hub. All rights reserved. Aim: In this paper, the emission of heavy metal ions from potential sorption materials is investigated. Samples were obtained by low-temperature pyrolysis from rubber waste (used car tires) and treated with dry ashing. The use of a solid pyrolysis product after ashing involves the purification of wastewater from contaminants. Methods: The content of heavy metal ions in aqueous extraction and extraction with an acetate-ammonium buffer of a solid product of pyrolysis of rubber waste was determined by means of atomic emission spectrometry. Of decreasing mass concentration, the heavy metal ions in the aqueous extract of the solid pyrolysis product after treatment with ashing are arranged in the following order: Zn, Si, Mn, Sr, Co, Ba, Mo, Ni, and Sb. In the acetate-ammonium extract of the test sample, the heavy metals are arranged in the following order in the order of decreasing values: Zn, Mn, Co, Fe, Sr, Cu, Al, Ni, B, V, Pb, Cr, Ba, Se, Pb, and Sb. Results: The obtained results show that the aqueous extract of the solid pyrolysis product of rubber waste after treatment with “dry” ashing does not exceed the normative indices for sewage by the content of heavy metals. According to the values of the concentration coefficient relative to the permissible concentration of pollutants in the wastewater admitted to discharge into the centralized system of wastewater disposal, the excess of the norm takes place according to Zn. Conclusions: It has been established that the solid pyrolysis product of rubber waste treated with ashing does not pollute the wastewater. This implies the possibility of using the processed pyrolysis product from environmental positions with limiting the discharge of wash water directly into fishery water reservoirs.

Keywords

Adsorption, Ashing, Emission, Heavy metal ions, Pyrolysis, Rubber waste

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